S500

COMPACT
DISC PLAYER

SERVICE MANUAL

S500
COMPACT
DISC PLAYER

NAD

CONTENTS

FRONT PANEL / REAR PANEL VIEW 3
SPECIFICATIONS 4
WIRING DIAGRAM 5
PCB LAYOUT 6-10
SCHEMATIC DIAGRAM 11-14
ELECTRICAL PARTS LIST 15-19
IC BLOCK DIAGRAM 20
EXPLODED VIEW 21
EXPLODED VIEW PARTS LIST 22
PACKING DIAGRAM 23

SERVICE SAFETY PRECAUTIONS

1. Replacing the Fuses

CAUTION: FOR CONTINUED PROTECTION AGAINST THE RISK OF FIRE REPLACE ONLY WITH SAME TYPE OF FUSE.

REFERENCE NO.	PART NUMBER	DESCRIPTION
AC INLET FUSE		Fuse Time Lag 500mA 250V 5x20mm UL/CSA
F451-F452*AH	5120-0032-0	Fuse Time Lag 2A 250V 5x20mm UL/CSA
AC INLET FUSE		Fuse Time Lag 250mA 250V 5x20mm SEMKO/VDE
F451-F452*C	5120-0065-0	Fuse Time Lag 2A 250V 5x20mm SEMKO/VDE

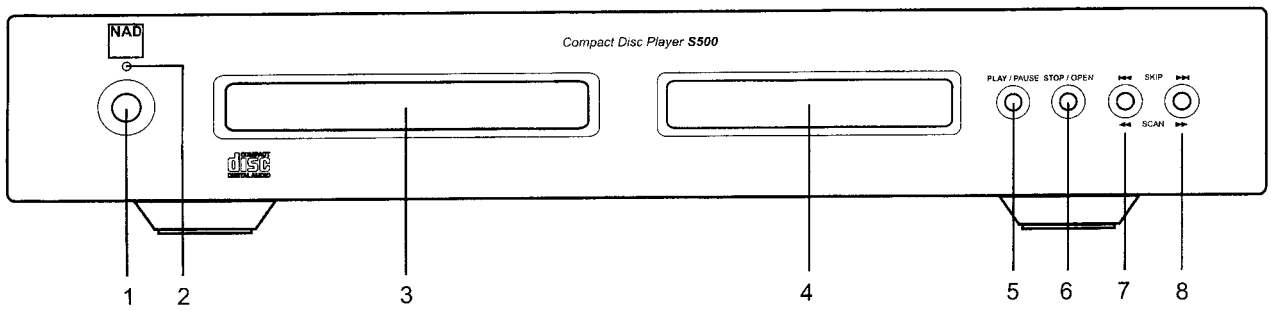
NOTE:
*AH : North American model only
*C : European model only

2. Safety-check out (North American model only)

Parts marked with the symbol ⚠ are critical with regard to the risk of fire and electric shock. Replace only with parts recommended by the manufacturer.

FRONT PANEL / REAR PANEL VIEW

FRONT PANEL CONTROLS

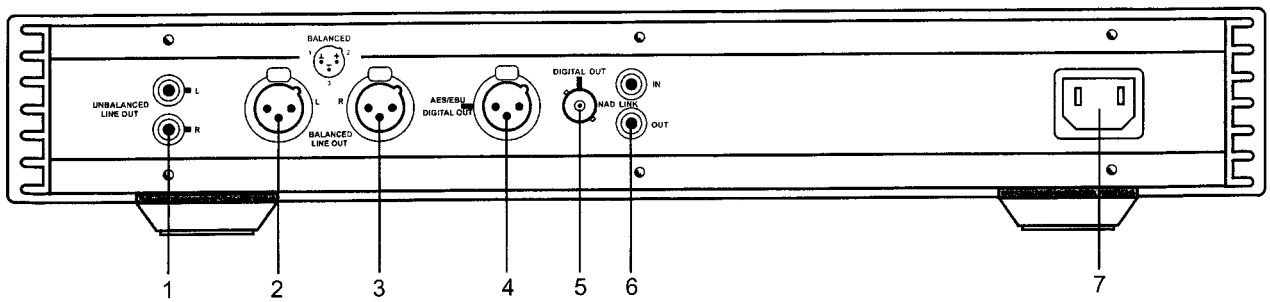


1. POWER SWITCH
2. POWER INDICATOR
3. DISC DRAWER
4. DISPLAY
5. PLAY/PAUSE
6. STOP/OPEN
7. SKIP/SCAN DOWN
8. SKIP/SCAN UP

The graphic symbol of a lightning flash with an arrow point within a triangle signifies that there is dangerous voltage within the unit and it posses a hazard to anyone removing the cover to gain access to the interior of the unit. **Only qualified service personnel should make such attempt.**

The graphic symbol of an exclamation point within an equilateral triangle warns a user of the device that it is necessary to refer to the instruction manual and its warnings for proper operation of the unit.

REAR PANEL CONNECTIONS



1. UNBALANCED LINE OUTPUT
2. LEFT BALANCED LINE OUPUT
3. RIGHT BALANCED LINE OUTPUT
4. AES/EBU BALANCED DIGITAL OUTPUT
5. COAXIAL DIGITAL OUTPUT
6. NAD LINK INPUT/OUTPUT
7. AC INLET

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES.
OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:
(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND
(2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

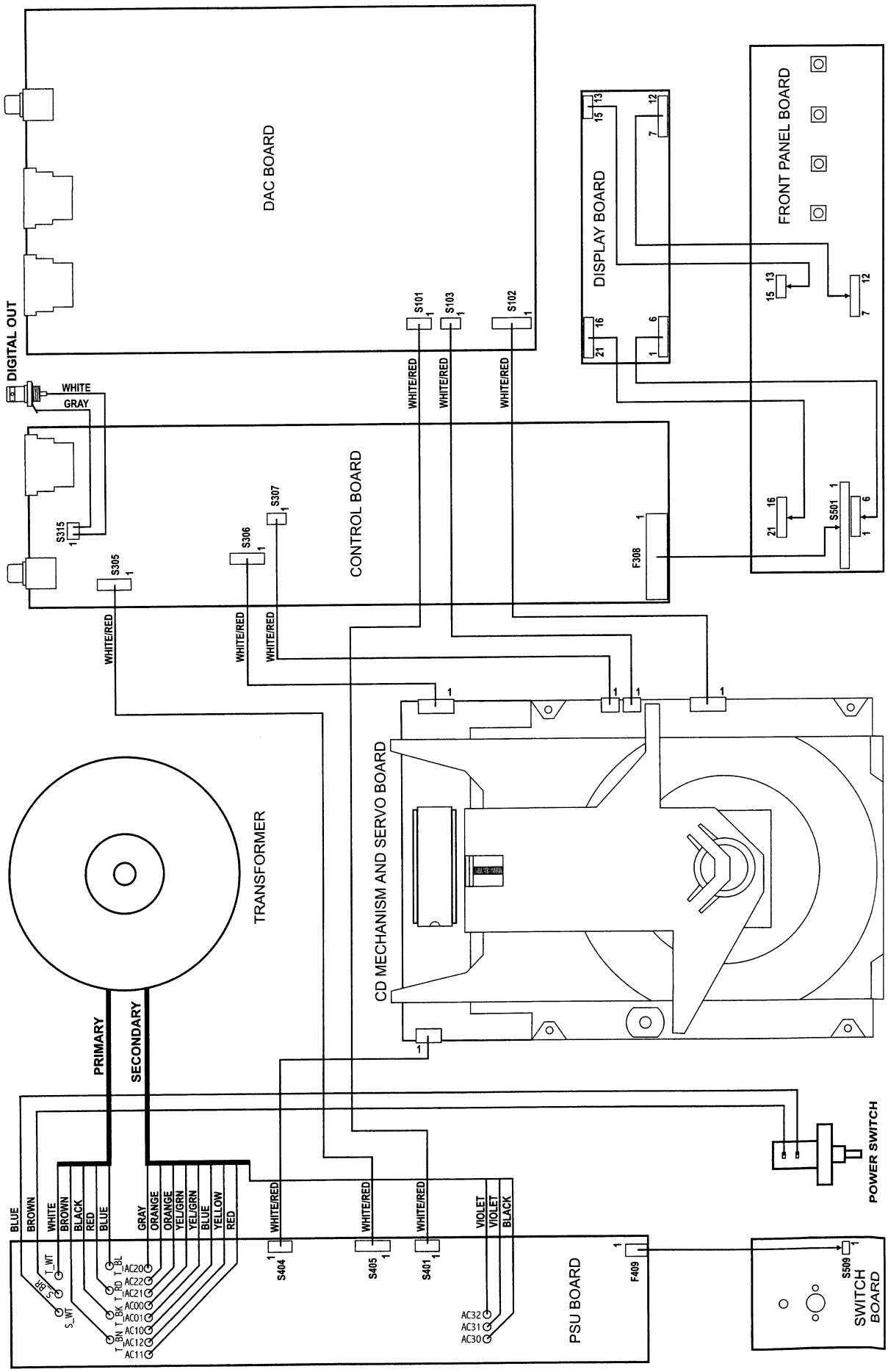
SPECIFICATIONS

Disc capacity		Single disc 120mm or 80mm
Digital-to-Analogue conversion		Crystal multi bit; 20-bit resolution
Analogue filter		5 pole active
Frequency response 5Hz-20kHz		+/-0.15dB
THD at 0dB, 1kHz		0.002%
Dynamic range		98dB
Linearity		+/-0.5dB from 0dB to -90dB
Signal-to-Noise ratio A-weighted (at play with de-emphasis)		110dB
Channel separation	1kHz 20kHz	100dB 99dB
Wow and flutter		Unmeasurable (Quartz accuracy)
Output impedance		120Ω
Output level at 0dB		2.2Vrms
Digital error correction		CIRC with double error correction in C1 and C2
Digital code output	Unbalanced Balanced	Sony/Philips serial data format AES/EBU serial data format

Physical specifications

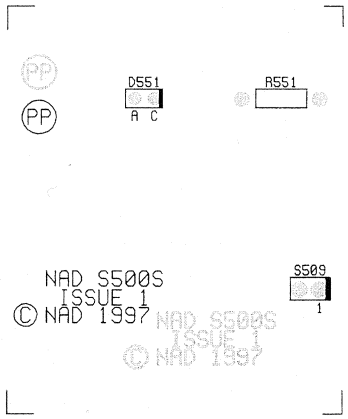
Dimensions (W x H x D)	450 x 67 x 286 mm
Net weight	5 kg / 11 lbs

WIRING DIAGRAM

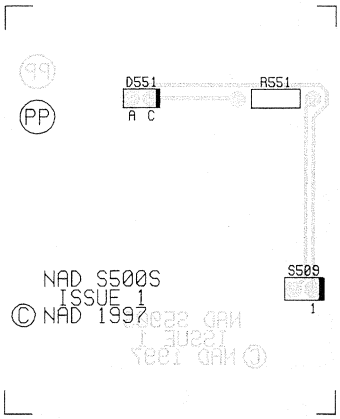


PCB LAYOUT

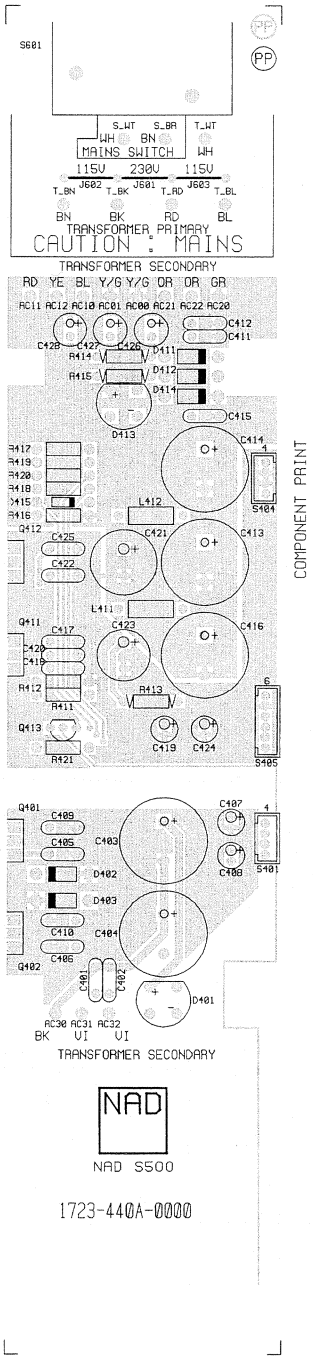
POWER SWITCH - COMPONENT SIDE



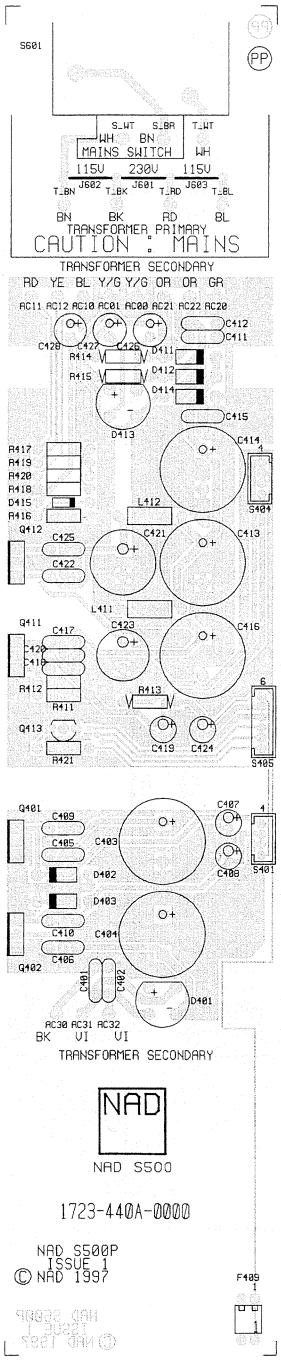
POWER SWITCH - SOLDER SIDE



PSU - COMPONENT SIDE

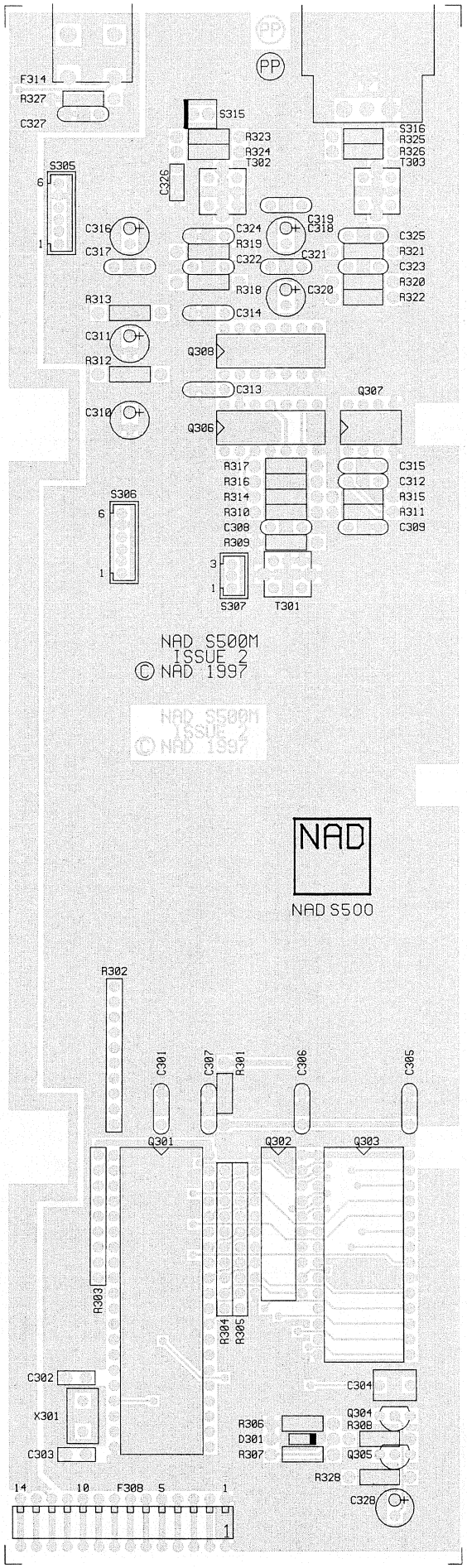


PSU - SOLDER SIDE

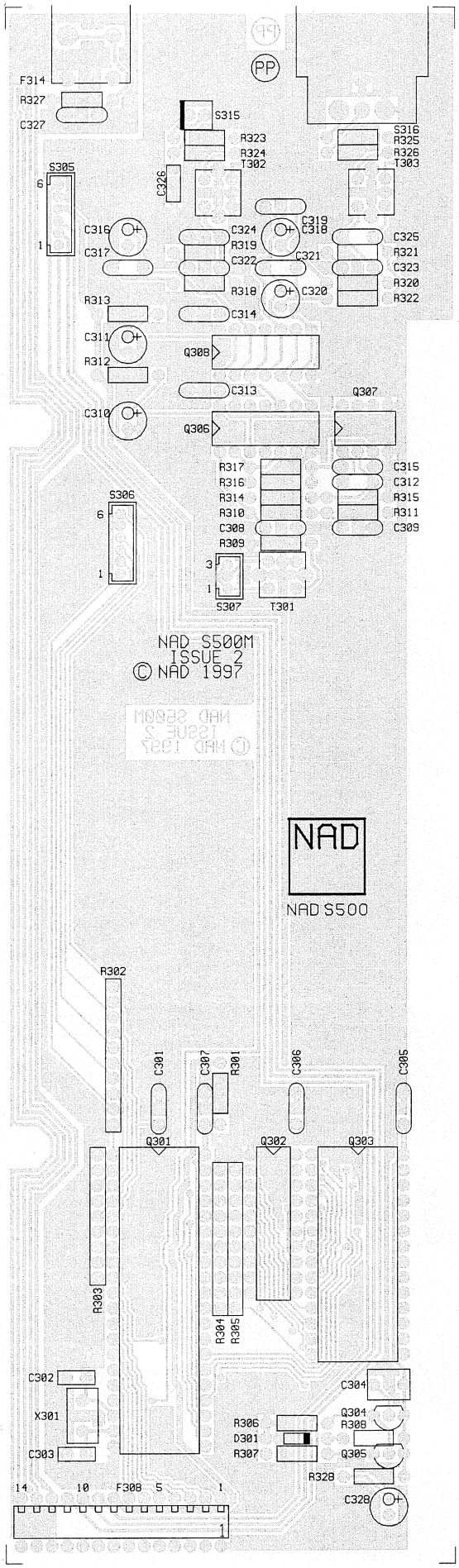


PCB LAYOUT

CONTROL - COMPONENT SIDE

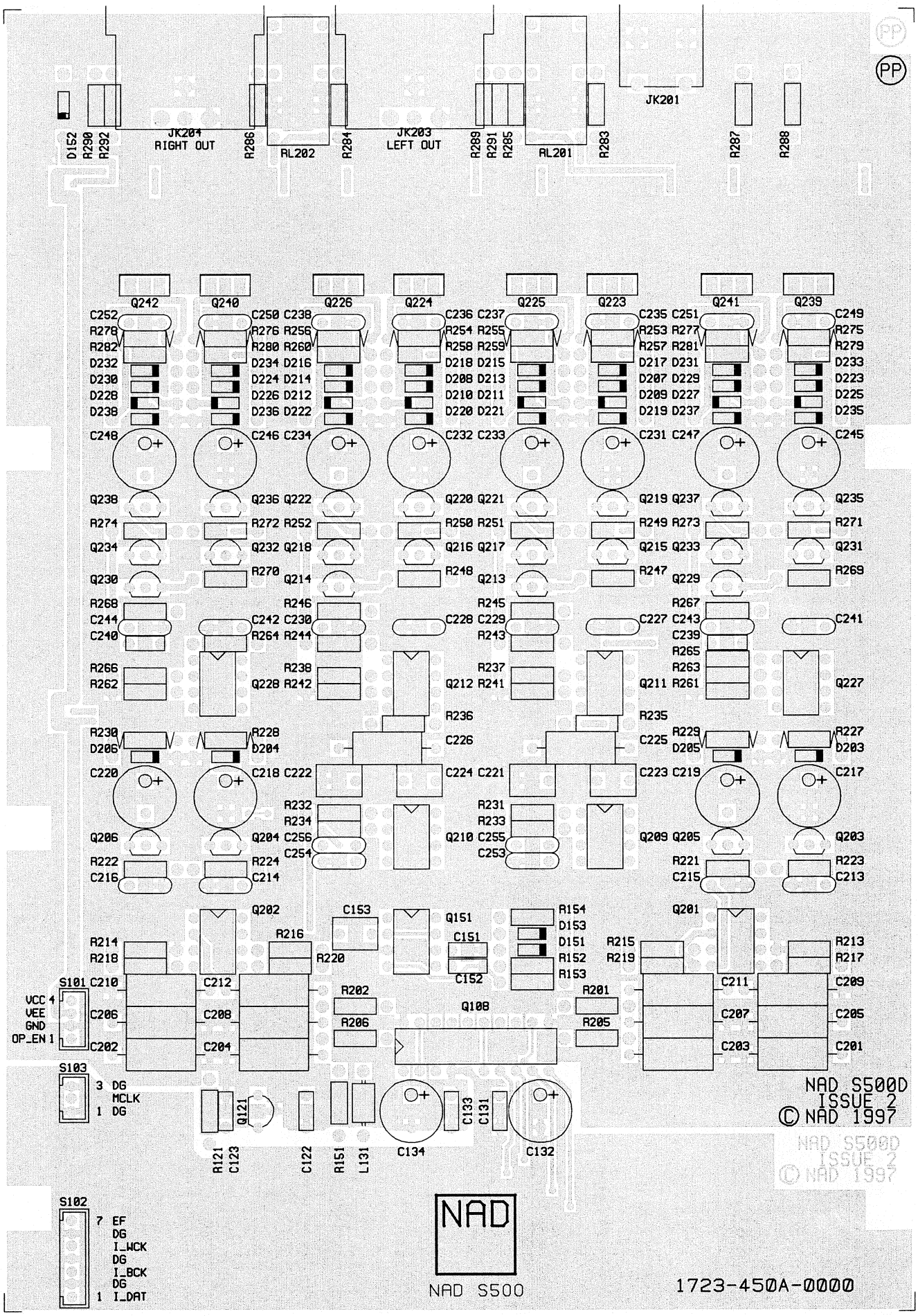


CONTROL - SOLDER SIDE



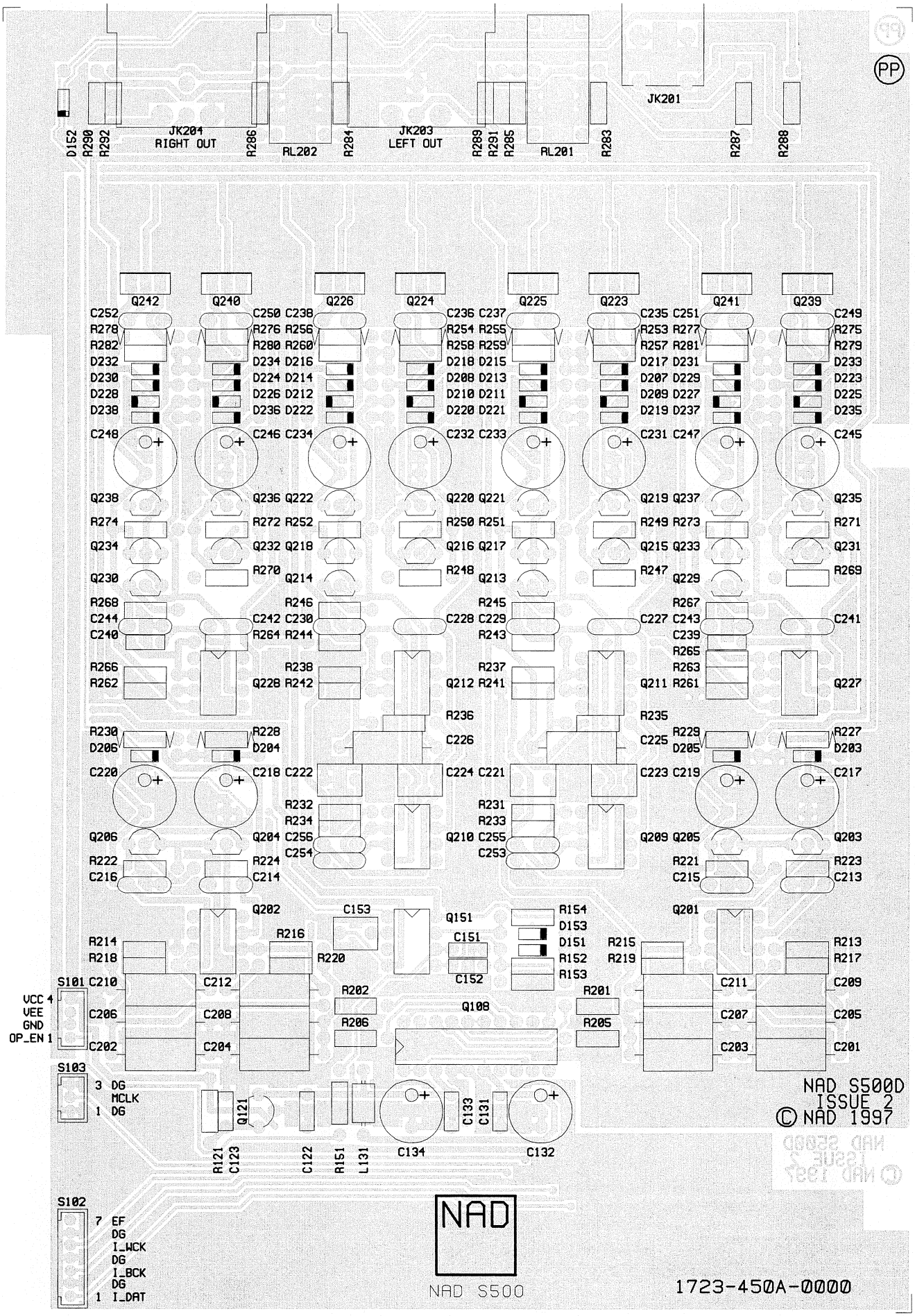
PCB LAYOUT

DAC BOARD - COMPONENT SIDE



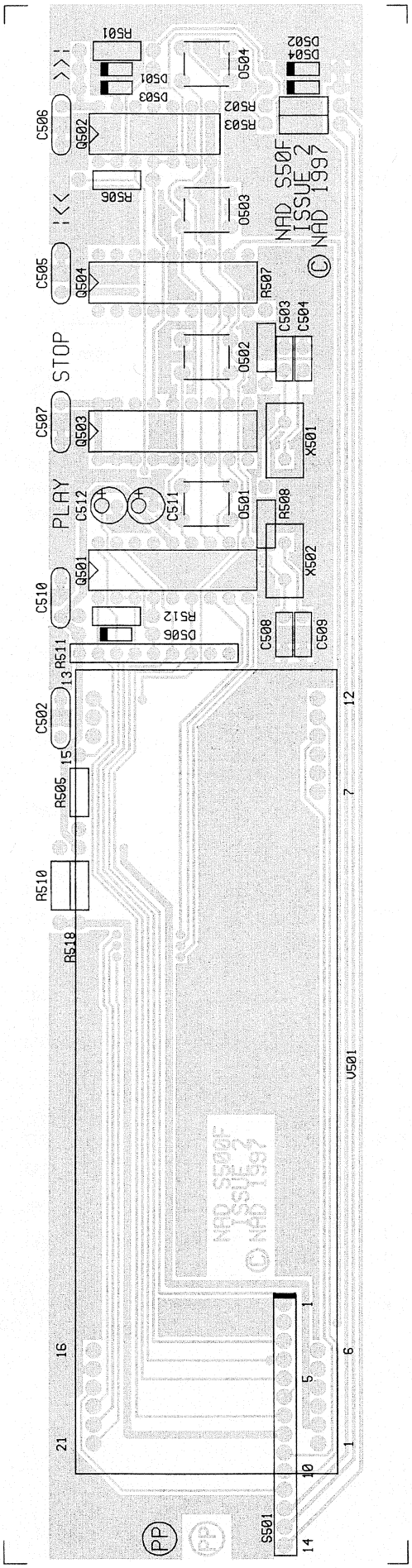
PCB LAYOUT

DAC BOARD - SOLDER SIDE

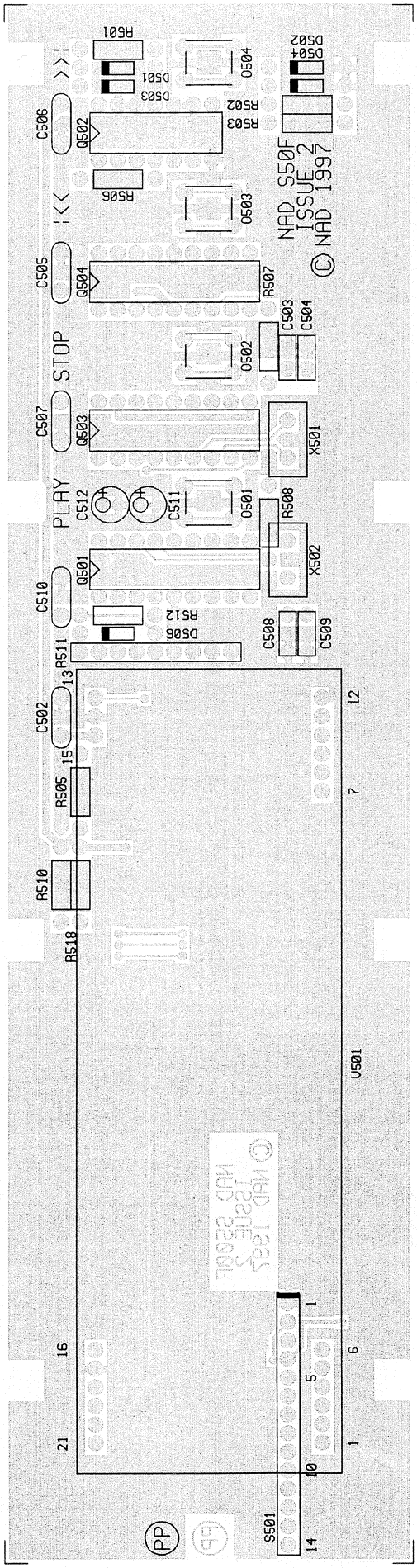


PCB LAYOUT

FRONT PANEL - COMPONENT SIDE

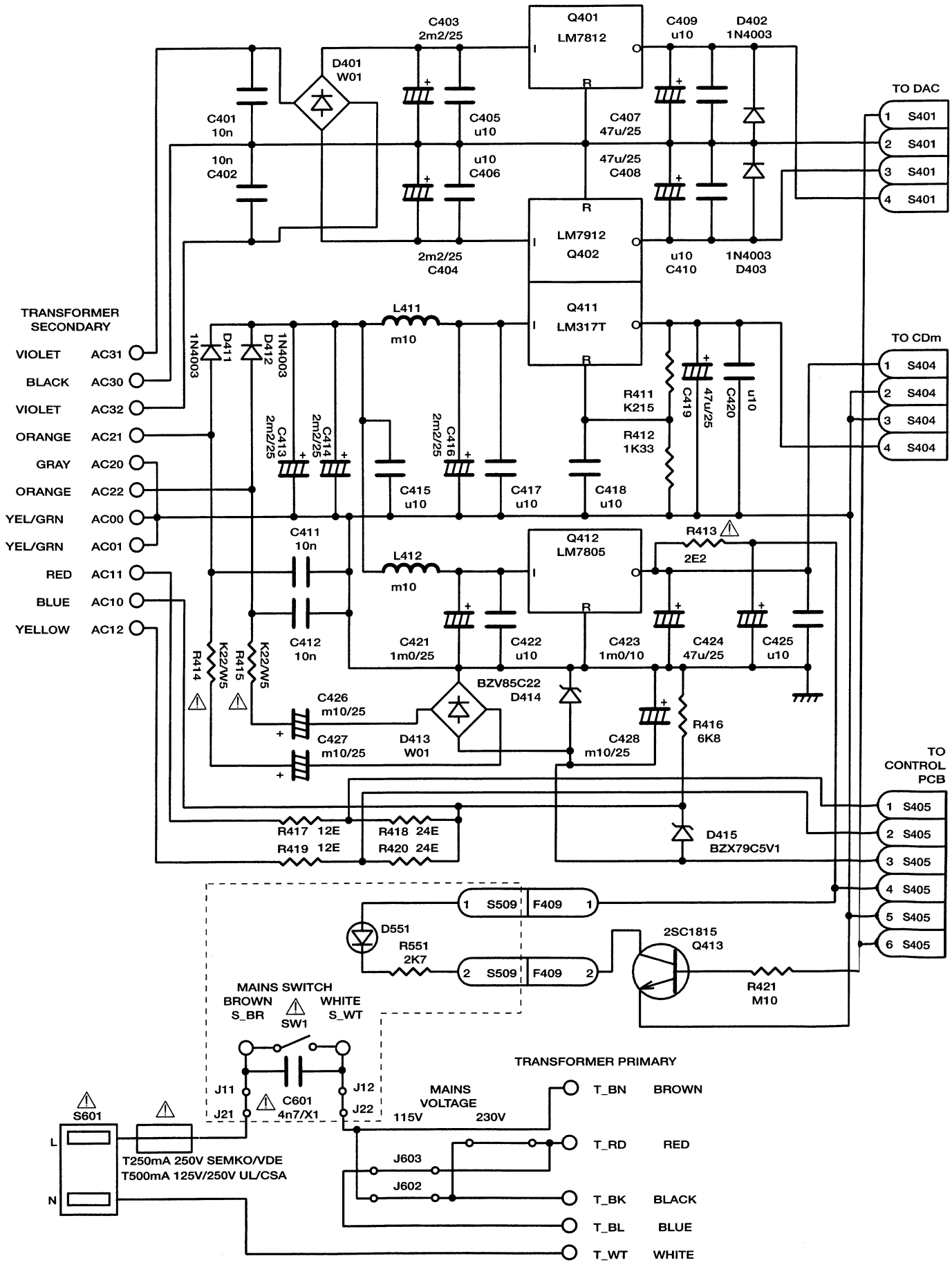


FRONT PANEL - SOLDER SIDE



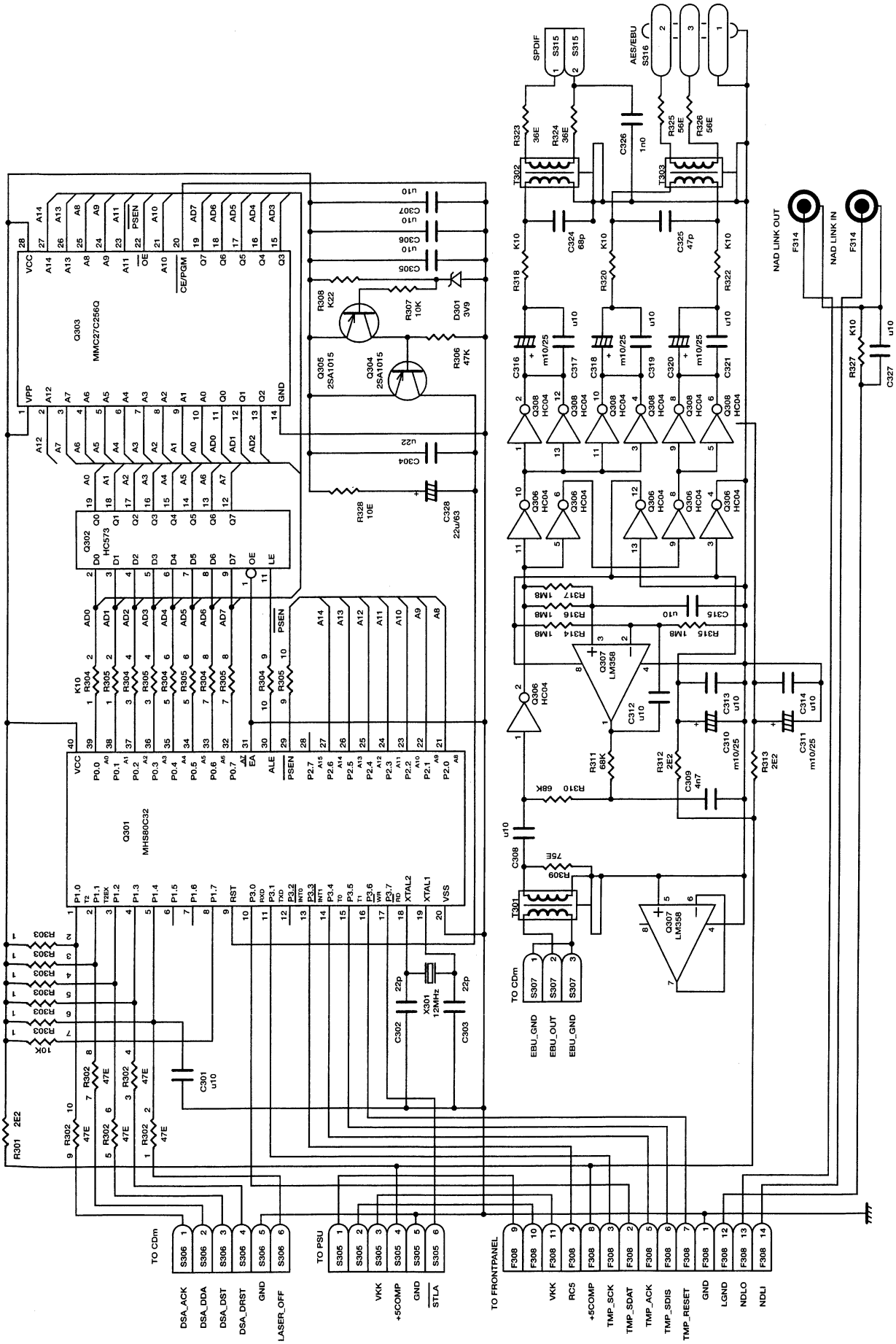
SCHEMATIC DIAGRAM

PSU BOARD



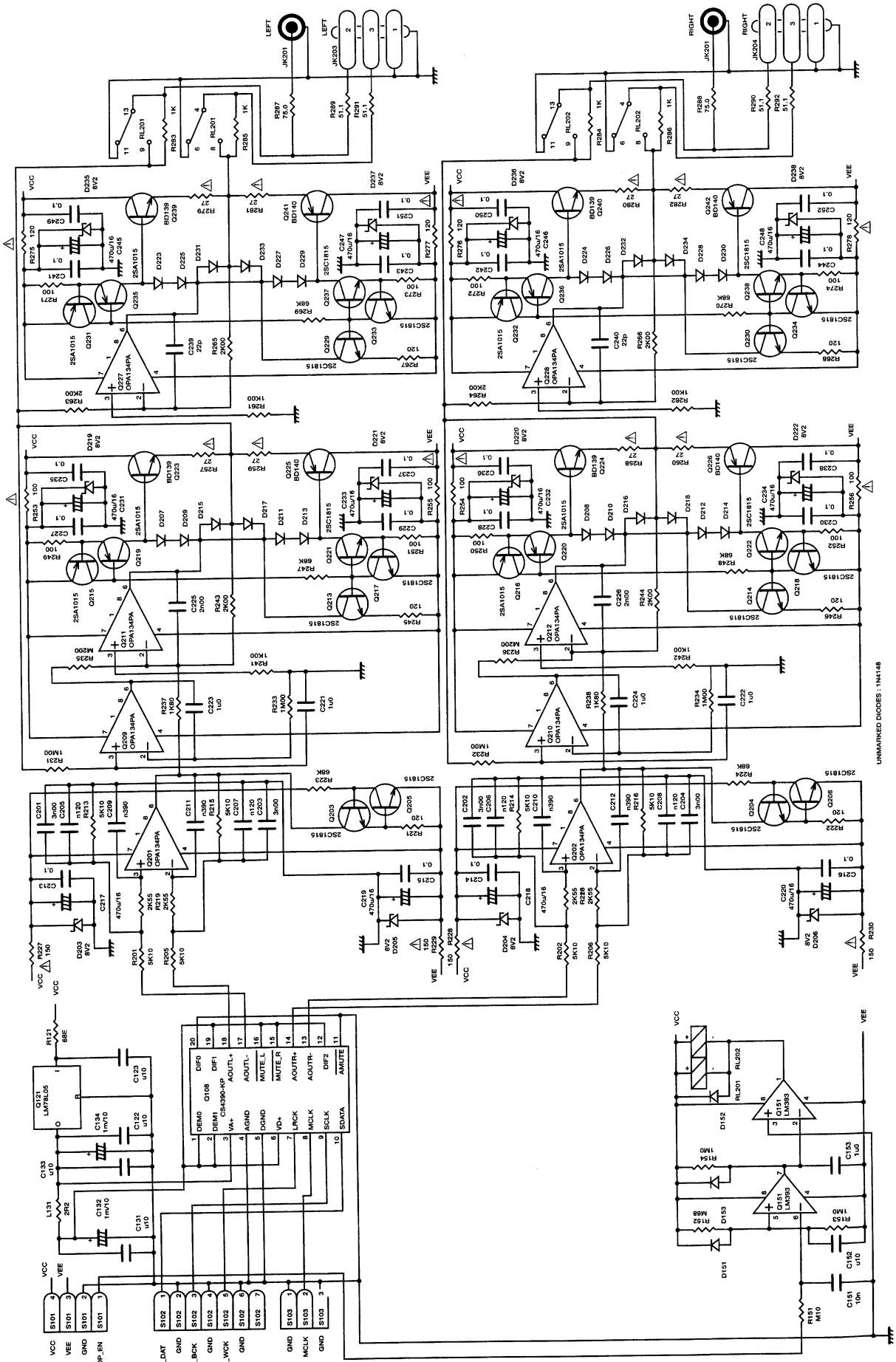
SCHEMATIC DIAGRAM

CONTROL BOARD



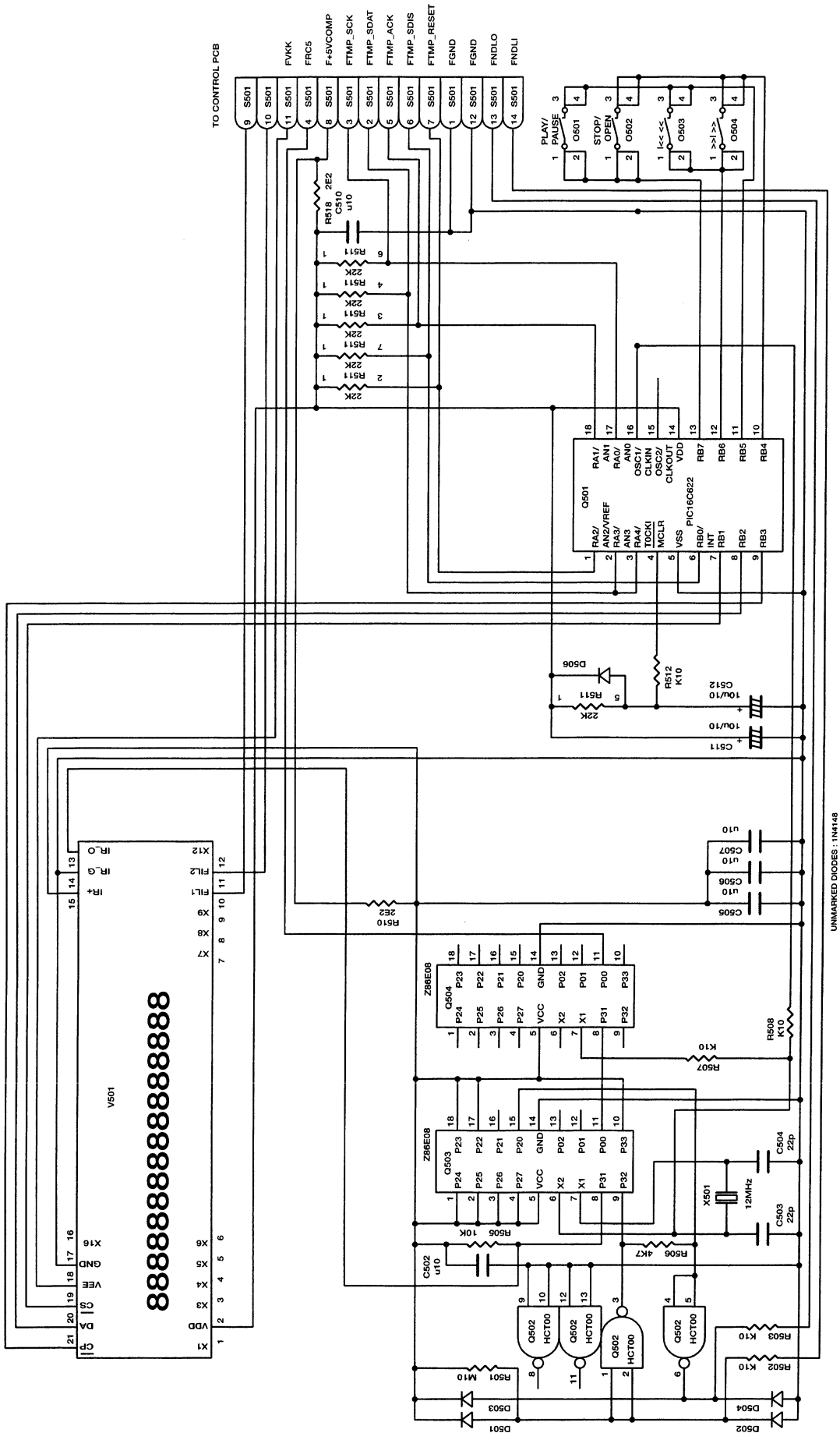
SCHEMATIC DIAGRAM

DAC BOARD



SCHEMATIC DIAGRAM

FRONT PANEL BOARD



ELECTRICAL PARTS LIST

Reference No	Part Number	Description
POWER SWITCH ASSEMBLY		
PCB BOARD	PCB-N0860C-SW	POWER SWITCH ASSEMBLY
CAPACITOR		
C601 ⚠	8910-0049-0	CAP400V 4700P DE7150F472MVA1KC
LED		
D551	3700-3538-B	BLUE LED 3MM
RESISTOR		
R551	471F-272J-2-E	RMF 0.4W 2.7K 5%
SWITCH		
SW1 ⚠	5200-3181-0-01	POWER SWITCH
PSU ASSEMBLY		
PCB BOARD	PCB-N0861C-PWR	PSU ASSEMBLY
CAPACITORS		
C403-C404	157E-228M-5-5&F	CE 25V 2200µF 20%
C405-C406	153I-104M-9-NLU	CM 63V 0.1µF 20%
C407-C408	157E-476M-5-IµF	CE 25V 47µF 20%
C409-C410	153I-104M-9-NLU	CM 63V 0.1µF 20%
C413-C414	157E-228M-5-5&F	CE 25V 2200µF 20%
C415	153I-104M-9-NLU	CM 63V 0.1µF 20%
C416	157E-228M-5-5&F	CE 25V 2200µF 20%
C417-C418	153I-104M-9-NLU	CM 63V 0.1µF 20%
C419	157E-476M-5-IµF	CE 25V 47µF 20%
C420,C422	153I-104M-9-NLU	CM 63V 0.1µF 20%
C421	157E-108M-5-X9F	CE 25V 1000µF 20%
C423	157C-108M-5-S9F	CE 10V 1000µF 20%
C424	157E-476M-5-IµF	CE 25V 47µF 20%
C425	153I-104M-9-NLU	CM 63V 0.1µF 20%
C426-C428	157E-107M-5-KµF	CE 25V 100µF 20%
DIODES		
D401,D413	4840-0490-0	BRIDGE RECTIFIER 100V 1.5A
D402-D403	4804-0010-2	DIODE 1N4001
D411-D412	4804-0010-2	DIODE 1N4001
D414	4840-2090-0	ZD 1.3W 22V BZV85C22 5%
D415	4837-5V11-2	ZD 1/2W 5.1V
INDUCTORS		
L411-L412	1803-0044-0	INDUCTOR 100uH B78108-S1104-J
ICS		
Q401	3130-2520-3	IC 7812 12V REGULATOR
Q402	3130-3800-0	IC UPC79M12HF REGULATOR
Q411	3130-5610-0	IC LM317T+ADJ REGULATOR
Q412	3130-2020-3	IC 7805 5V REGULATOR

Reference No		Part Number	Description
TRANSISTOR			
Q413		4860-0700-5	TR 2SC1815
RESISTORS			
R411		471G-2150-2-E	RMF 0.6W 215R 1%
R412		471G-1331-2-E	RMF 0.6W 1.33K 1%
R413	⚠	471E-2R2J-2-EF	RFU 0.3W 2.2R 5%
R414-R415	⚠	4717-221J-2-EF	RFU 0.5W 220 5%
R416		471G-682A-2-E	RMF 0.6W 6.8K 1%
R417,R419		471G-120A-2-E	RMF 0.6W 12R 1%
R418,R420		471G-240A-2-E	RMF 0.6W 24R 1%
R421		471G-104A-2-E	RMF 0.6W 100K 1%
CONTROL ASSEMBLY			
PCB BOARD			
		PCB-N0860C-CPU	CONTROL ASSEMBLY
CAPACITORS			
C301		153I-104M-9-NLU	CM 63V 0.1μF 20%
C302-C303		15CG-220A-5-GIE	CC 100V 22pF 1% NPO
C304		153I-224M-9-NNU	CM 63V 0.22μF 20%
C305-C308		153I-104M-9-NLU	CM 63V 0.1μF 20%
C310-C311		157E-107M-5-LUC	CE 25V 100μF 20%
C312-C315		153I-104M-9-NLU	CM 63V 0.1μF 20%
C316,C318,C320		157E-107M-5-LUC	CE 25V 100μF 20%
C317,C319,C321		153I-104M-9-NLU	CM 63V 0.1μF 20%
C324		15CH-680J-5-KG	CC 50V 68pF 5% NPO
C325		15CH-470J-5-KG	CC 50V 47pF 5% NPO
C327		153I-104M-9-NLU	CM 63V 0.1μF 20%
C328		157I-226M-5-LU	CE 63V 22μF 20%
DIODE			
D301		4837-3B20-2	ZD 1/2W 3.8-4.0V
JACKS			
F314		2113-1121-0	2P RCA JACK Y/Y AU HSP-242V-22
S315		2113-1325-0	BNC SPDIF OUT
S316		2113-1151-0	XLR AES/EBU OUT
ICS			
Q301		3130-8400-0	IC MHS80C32 UPC
Q302		3130-6140-0	IC 74HC573 8X D-TYPE LATCHES
Q303		3130-8410-0	IC MMC27C256Q EPROM
Q306,Q308		3130-5840-0	IC 74HC04 HEX INVERTERS
Q307		3130-8390-0	IC LM358N OP AMP DIP8
TRANSISTORS			
Q304-Q305		4860-0660-5	TR 2SA1015
RESISTORS			
R301		471F-2R2J-2-E	RMF 0.4W 2.2R 5%
R302		4707-470C-5-5	RCFA 1/2W 47R 2%
R303		4707-103C-5-8	RCFA 1/2W 10K 2%
R304-R305		4707-101C-5-5	RCFA 1/2W 100R 2%
R306		471F-473J-2-E	RMF 0.4W 47K 5%
R307		471F-103J-2-E	RMF 0.4W 10K 5%
R308		471F-221J-2-E	RMF 0.4W 220 5%

Reference No	Part Number	Description
R309	471F-750J-2-E	RMF 0.4W 75R 5%
R310-R311	471F-683J-2-E	RMF 0.4W 68K 5%
R312-R313	471F-2R2J-2-E	RMF 0.4W 2.2R 5%
R314-R317	471F-185J-2-E	RMF 0.4W 1.8M 5%
R318,R320,R322	471F-101J-2-E	RMF 0.4W 100R 5%
R323-R324	471F-360J-2-E	RMF 0.4W 36R 5%
R325-R326	471F-560J-2-E	RMF 0.4W 56R 5%
R327	471F-101J-2-E	RMF 0.4W 100R 5%
R328	4715-100J-2	RMF 1/4W 10R 5%
COILS		
T301-T303	1802-0450-0	DIGITAL COIL 015-910-27BB
RESONATOR		
X301	2703-0190-0	CR RESONATOR CSA 12MHZ
FRONT PANEL BOARD ASSEMBLY		
PCB BOARD	PCB-N0860C-DISP	FRONT PANEL BOARD ASSEMBLY
CAPACITORS		
C503-C504	15CG-220A-5-GIE	CC 100V 22pF 1% NPO
C511-C512	157D-106M-5-GIL	CE 16V 10μF 20%
DIODES		
D501-D506	4804-1480-2	DIODE 1N4148
SWITCHES		
O501-O504	5200-3011-0-01	TACT SWITCH 4P
ICS		
Q501	3130-8420-0	IC PIC16C622A-20 I/P CONTROLLER
Q502	3130-7370-0	IC 74HCT00 NAND GATE
Q503-504	3130-6410-0	IC Z86E08 OTP MICROCONTROLLER
RESISTORS		
R501	471F-104J-2-E	RMF 0.4W 100K 5%
R502-R503	471F-101J-2-E	RMF 0.4W 100R 5%
R505	471F-103J-2-E	RMF 0.4W 10K 5%
R506	471F-472J-2-E	RMF 0.4W 4.7K 5%
R507-R508	471F-101J-2-E	RMF 0.4W 100R 5%
R510,R518	471F-2R2J-2-E	RMF 0.4W 2.2R 5%
R511	4707-223C-5-8	RCFA 1/2W 22K 2%
R512	471F-101J-2-E	RMF 0.4W 100R 5%
RESONATOR		
X501	2703-0190-0	CR RESONATOR CSA 12MHZ
DAC BOARD ASSEMBLY		
PCB BAORD	PCB-N0860C-MAIN	DAC BOARD ASSEMBLY
CAPACITORS		
C122-C123,C131	153I-104M-9-NLU	CM 63V 0.1μF 20%
C132,C134	157C-108M-5-S9F	CE 10V 1000μF 20%
C133,C152	153I-104M-9-NLU	CM 63V 0.1μF 20%

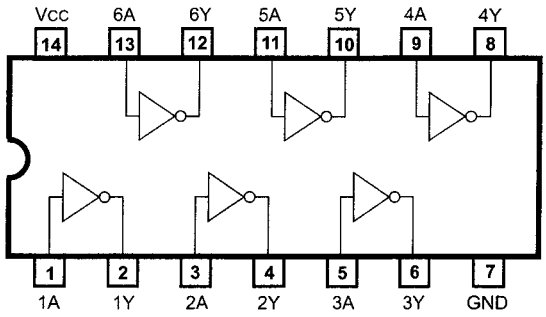
Reference No	Part Number	Description
C151	15FI-103Z-5-HKE	CC 63V 0.01u +80/-20%
C153	153I-105J-9-NSU	CM 63V 1µF 5%
C201-C204	158S-302A-2-IUE	CP 160V 3000pF 1%
C205-C208	158M-121A-2-IUE	CP 630V 120pF 1%
C209-C212	158M-391A-2-IUE	CP 630V 390pF 1%
C213-C216	153I-104M-9-NLU	CM 63V 0.1µF 20%
C217-C220	157D-477M-5-SXF	CE 16V 470µF 20%
C221-C224	153I-105J-9-NSU	CM 63V 1µF 5%
C225-C226	158R-202A-2-IUE	CP 250V 2000pF 1%
C227-C230	153I-104M-9-NLU	CM 63V 0.1µF 20%
C231-C234	157D-477M-5-SXF	CE 16V 470µF 20%
C235-C238	153I-104M-9-NLU	CM 63V 0.1µF 20%
C239-C240	15CG-220A-5-GIE	CC 100V 22pF 1% NPO
C241-C244	153I-104M-9-NLU	CM 63V 0.1µF 20%
C245-C248	157D-477M-5-SXF	CE 16V 470µF 20%
C249-C252	153I-104M-9-NLU	CM 63V 0.1µF 20%
DIODES		
D151-D153,D207-D218	4804-1480-2	DIODE 1N4148
D203-D206,D219-D222	4837-8V23-2	DZ 1/2W 8.2V
D223-D234	4804-1480-2	DIODE 1N4148
D235-D238	4837-8V23-2	DZ 1/2W 8.2V
JACKS		
JK201	2113-1203-0	2P RCA JACK W/R AU
JK203-JK204	2113-1151-0	XLR BALANCE OUT
ICs		
Q108	3130-8380-0	IC CS4390-KP STEREO DAC
Q121	3130-0640-0	IC NJM78L05A 826
Q151	3131-5160-0	IC LM393N
Q201-Q202,Q209-Q212	3130-6940-0	IC OPA134PA OP AMP
Q227-Q228	3130-6940-0	IC OPA134PA OP AMP
TRANSISTORS		
Q203-Q206,Q213-Q214	4860-0700-5	TR 2SC1815
Q215-Q216	4860-0660-5	TR 2SA1015
Q217-Q218	4860-0700-5	TR 2SC1815
Q219-Q220	4860-0660-5	TR 2SA1015
Q221-Q222	4860-0700-5	TR 2SC1815
Q223-Q224	485D-1390-5	TR BD139-10 HFE 63-160
Q225-Q226	4860-1430-5	TR BD140-10 HFE 63-160
Q229-Q230	4860-0700-5	TR 2SC1815
Q231-Q232	4860-0660-5	TR 2SA1015
Q233-Q234	4860-0700-5	TR 2SC1815
Q235-Q236	4860-0660-5	TR 2SA1015
Q237-Q238	4860-0700-5	TR 2SC1815
Q239-Q240	485D-1390-5	TR BD139-10 HFE 63-160
Q241-Q242	4860-1430-5	TR BD140-10 HFE 63-160
RESISTORS		
R121	471F-680J-2-E	RMF 0.4W 68R 5%
R151	471F-104J-2-E	RMF 0.4W 100K 5%
R152	471F-684J-2-E	RMF 0.4W 680K 5%
R153-R154	471F-105J-2-E	RMF 0.4W 1M 5%

Reference No		Part Number	Description
R201-R206,R213-R216		471G-512A-2-E	RMF 0.6W 5.1K 1%
R217-R220		471G-2551-2-E	RMF 0.6W 2.55K 1%
R221-R222		471F-121J-2-E	RMF 0.4W 120R 5%
R223-R224		471F-683J-2-E	RMF 0.4W 68K 5%
R227-R230	⚠	471E-151J-2-EF	RFU 0.3W 150R 5%
R231-R234		471G-105A-2-E	RMF 0.6W 1M 1%
R235-R236		471G-204A-2-E	RMF 0.6W 200K 1%
R237-R238		471G-182A-2-E	RMF 0.6W 1.8K 1%
R241-R242		471G-102A-2-E	RMF 0.6W 1K 1%
R243-R244		471G-202A-2-E	RMF 0.6W 2K 1%
R245-R246		471F-121J-2-E	RMF 0.4W 120R 5%
R247-R248		471F-683J-2-E	RMF 0.4W 68K 5%
R249-R252		471F-101J-2-E	RMF 0.4W 100R 5%
R253-R256	⚠	471E-101J-2-EF	RFU 0.3W 100R 5%
R257-R260	⚠	471E-270J-2-EF	RFU 0.3W 27R 5%
R261-R262		471G-102A-2-E	RMF 0.6W 1K 1%
R263-R266		471G-202A-2-E	RMF 0.6W 2K 1%
R267-R268		471F-121J-2-E	RMF 0.4W 120R 5%
R269-R270		471F-683J-2-E	RMF 0.4W 68K 5%
R271-R274		471F-101J-2-E	RMF 0.4W 100R 5%
R275-R278	⚠	471E-121J-2-EF	RFU 0.3W 120R 5%
R279-R282	⚠	471E-270J-2-EF	RFU 0.3W 27R 5%
R283-R286		471F-102J-2-E	RMF 0.4W 1K 5%

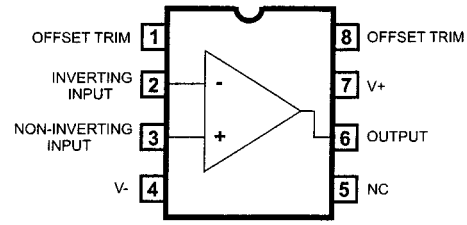
NOTE : – **The components identified by ⚠ mark are critical for risk of fire and electrical shock. Replace only with part number specified.**
– **Capacitors : CM-Mylar, CE-Electrolytic, CC-Ceramic, CP-Polystyrere.**
– **Resistors : RMF-Metal Film, RFU-Fusible.**

IC BLOCK DIAGRAM

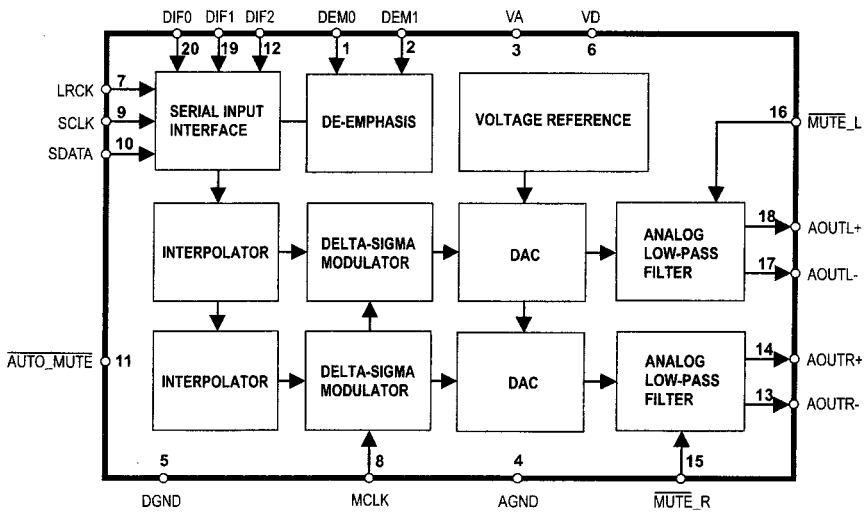
Q306, Q308: 74HC04
HEX INVERTERS



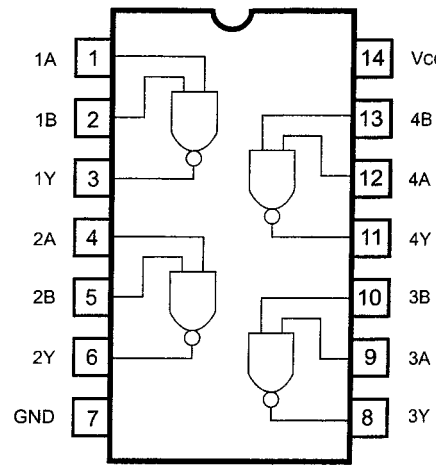
Q201-Q202, Q209-Q212, Q227-Q228: OPA134PA
HIGH PERFORMANCE MONO OP-AMP



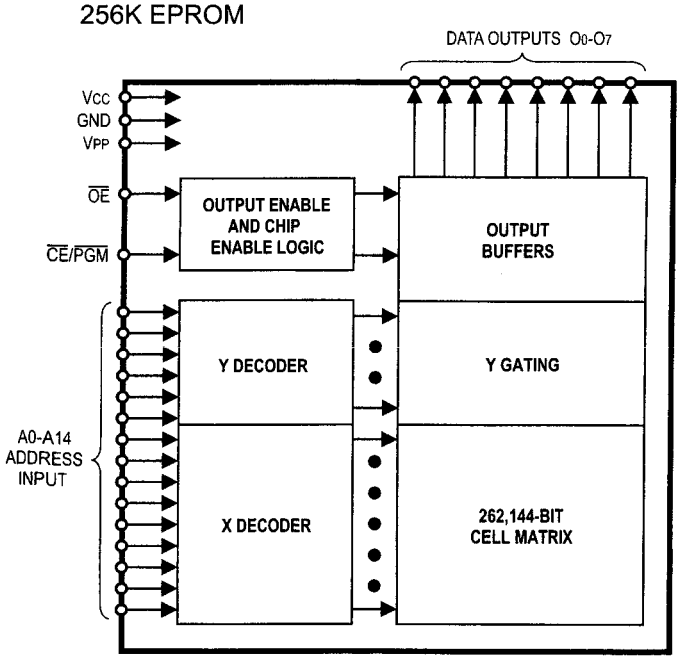
Q108: CS4390
24-BIT STEREO DAC



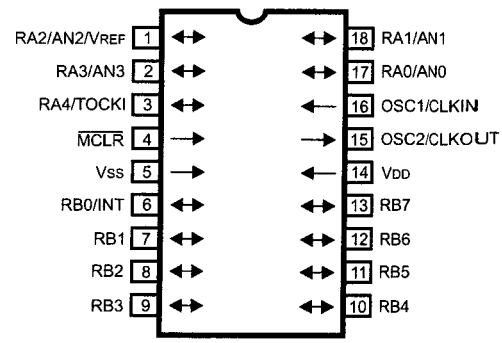
Q502: 74HCT00
2-INPUT QUAD NAND GATE



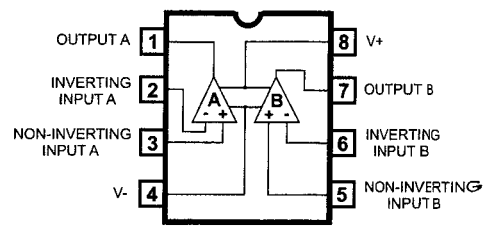
Q303: MMC27C256Q
256K EPROM



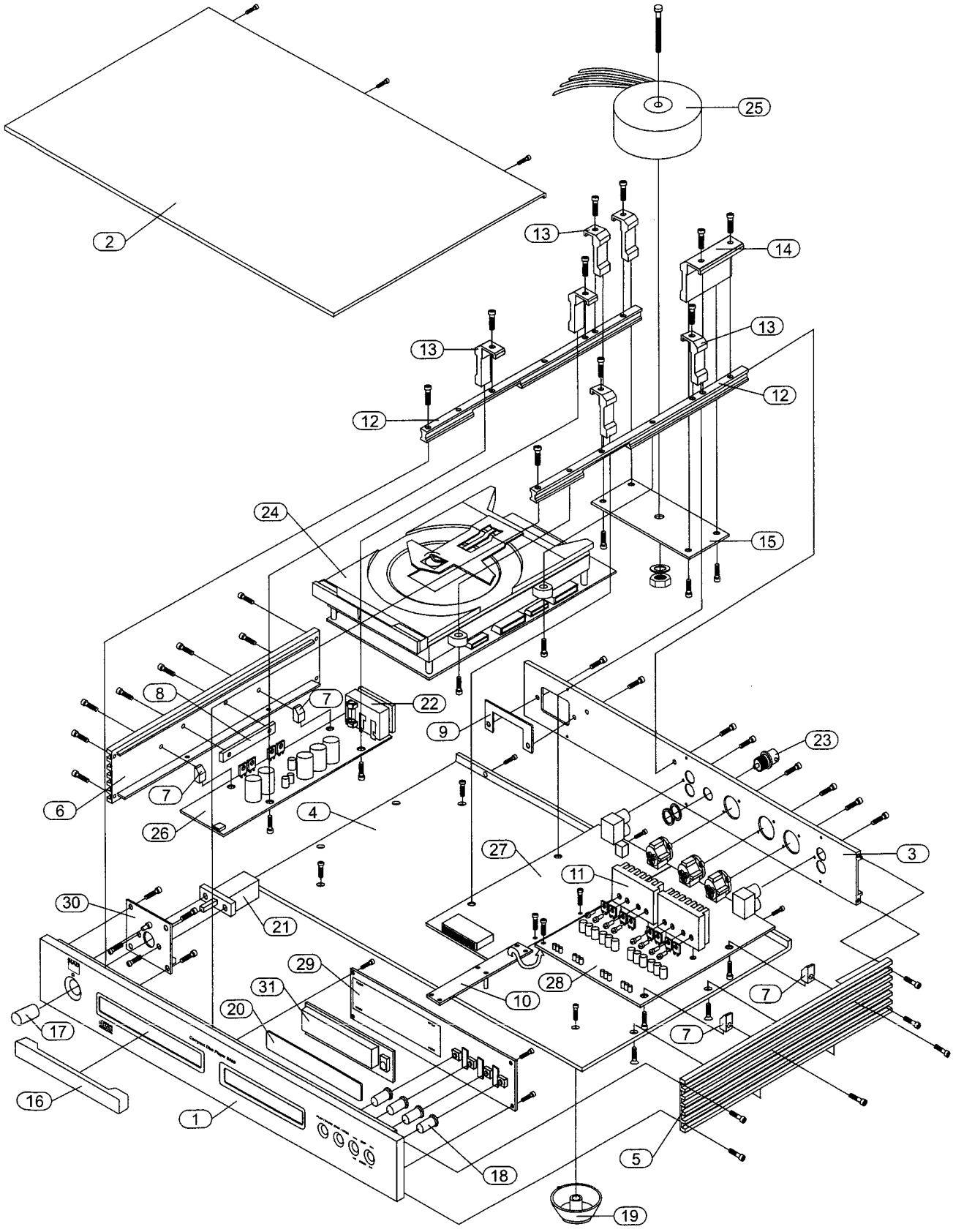
Q501: PIC16C622A-20
8-BIT MICROCONTROLLER



Q151: LM393N
LOW OFFSET DUAL COMPARATOR
Q307: LM358N
DUAL OP-AMP



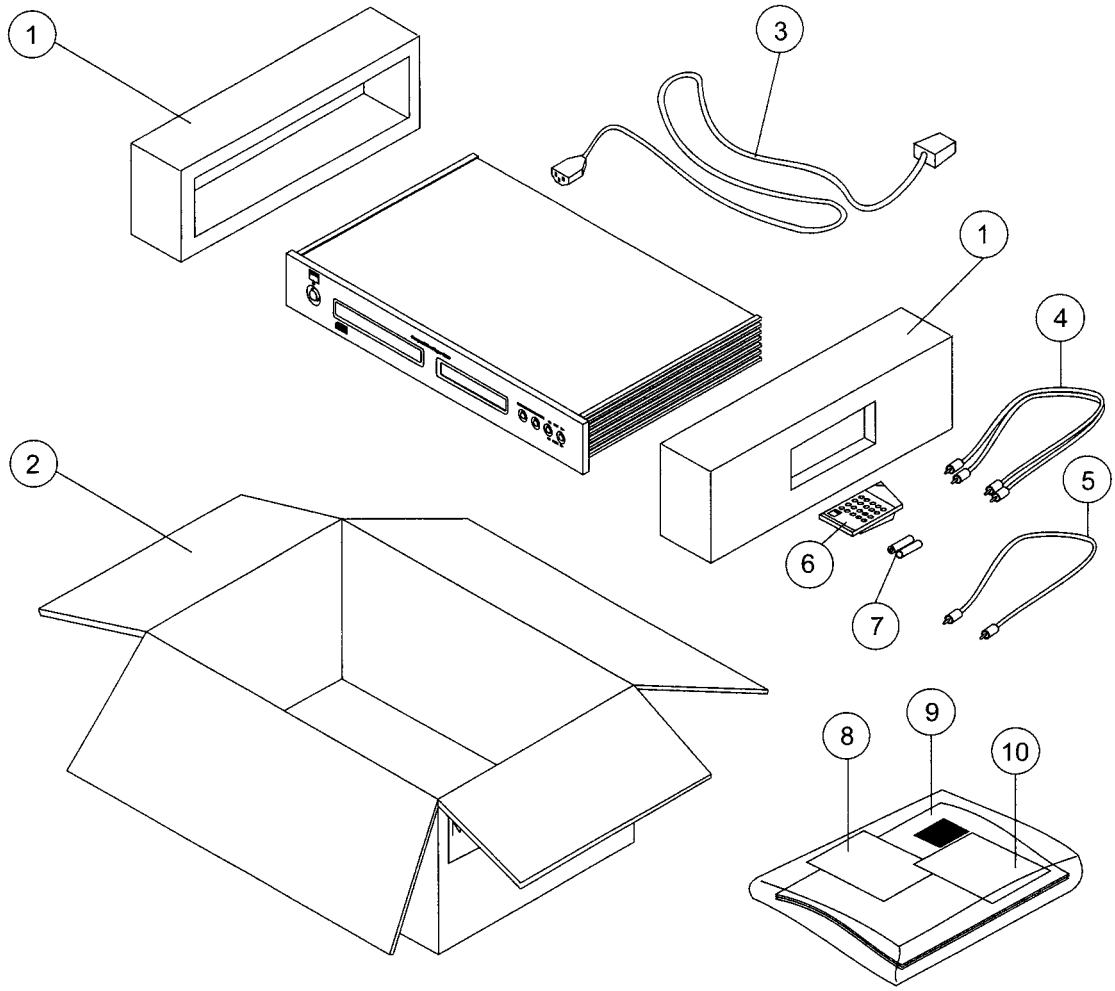
EXPLODED VIEW



EXPLODED VIEW PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY.
1	S500-2001-4	FASCIA	1
2	S500-2004-1	TOP COVER	1
3*AH	S500-2005AH-1	REAR PANEL 120V	1
3*C	S500-2005C-1	REAR PANEL 230V	1
4	S500-2003-1	BASE PLATE	1
5	S500-2002R-1	RIGHT SIDE PANEL	1
6	S500-2002L-1	LEFT SIDE PANEL	1
7	S500-2026-1	PCB BAR	4
8	S500-2036-1	CLAMP BAR	1
9	S100-2020-1	AC INLET PLATE	1
10	S500-2016-1	PCB PLATE	1
11	S100-2009-4	HEATSINK 1	2
12	S500-2006-1	CD MECHANISM BAR	2
13	S500-2046-1	PCB HOLDER	6
14	S500-2056-1	TRANSFORMER HOLDER	1
15	S500-2066-1	TRANSFORMER PLATE	1
16	S500-2008-1	CD TRAY LID	1
17	S100-2011-3	10MM POWER BUTTON	1
18	S400-2121-1	6MM INPUT BUTTON	4
19	S100-2013-2	FOOT W/ RUBBER CUSHION	4
20	S400-2221-1	DISPLAY LENS	1
21	5200-3181-0-01	POWER SWITCH	1
22	AC1	AC INLET	1
23	S500-0206	BNC CONNECTOR	1
24	L1265	CD MECHANISM W/ LOADER	1
25	TI-65575A	TRANSFORMER	1
26	S500-0130	PSU PCB	1
27	S500-0100	CONTROL PCB	1
28	S500-0150	DAC PCB	1
29	S500-0170	FRONT PANEL PCB	1
30	S500-0205	POWER SWITCH PCB W/ SWITCH	1
31	S400-DISPLAY	DISPLAY MODULE	1

PACKING DIAGRAM



ITEM	PART NUMBER	DESCRIPTION	QTY.
1	311215	POLYFOAM	1 SET
2	S500-2210-A	CARTON BOX	1
3*AH	POW4	POWER CORD NEMA 1-15 POLARIZED	1
3*C	POW2	POWER CORD CEE (7) XVII	1
4	101-000A	AUDIO CABLE	1
5	101-000B	NAD LINK CABLE	1
6	RC S500	REMOTE CONTROL HANDSET	1
7	R03	BATTERY	1 SET
8	WARR	WARRANTY CARD	1
9	S500-IM	INSTRUCTION MANUAL	1
10	D7051	S500 PREMIUM CARD	1

Proprietary information for servicing purposes only. The information herein may not be used commercially without the prior written agreement of NAD Electronics International, Toronto, Canada.